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ECONOMICS OF DATE PALM GROWING IN PUNJAB, PAKISTAN

Khuda Bakhsh, Basharat Ali Saleem, Raheel Anwar, Khurram Ziaf and Zahoor Hussain*
*Department of Environmental and Resource Economics, University of Agriculture, Faisalabad, Pakistan
Institute of Horticultural Sciences, University of Agriculture, Faisalabad, Pakistan

ABSTRACT

The present study has been designed with an objective to determine profitability of date palm trees. For this purpose, a field survey was conducted to collect information regarding use of various inputs and output, prices of inputs and outputs by employing personal interview method. A total of 20 date palm growers were selected purposely from various villages of Multan, Pakistan. Using information collected from the growers, net present worth (NPW) and cost benefit ratio (CBR) were estimated. NPW of Rs. 50,527 per acre was estimated for the sampled respondents which indicate that the date cultivation fetches higher returns whereas CBR is reasonably high (1.48) implying that investing one rupee in the date cultivation is highly profitable. Cash flow statement suggests that net present worth is positive and total cost was covered during this period. Positive net present worth also highlights that the date cultivation will continue positive returns over a long period of time.

Keywords: Date palm; production; gross income; cash flow statement; Multan.

INTRODUCTION

Uncertainty in the food production and rising population of Pakistan are burning issues in recent years since, production per acre and productivity are extremely low as compared to the developed countries. Wheat, rice and other staple crops are not fulfilling the increasing demand of food requirements of population. In such conditions, the date palm offers a good food source of high nutritive value; this tree gives many date growing countries in remote areas, the main food for a considerable number of people and provides working conditions to considerable numbers of laborers in the rural areas.

Moreover, the date palm tree grows well in the areas where climatic and soil conditions are relatively harsh and no other crop could be planted. In such areas, the date palm tree fetches higher returns to the people living in such climatic conditions. In fact, date palm which is irreplaceable tree in irrigable desert lands, provides protection to under-crops from heat, wind and even cold weather, and plays a big role to stop desertification and to give life to desert area. Its fruit and trunks are utilized in many small industries which provide packing materials for local marketing of fruits and vegetables as well as for many other uses. The tree and fruit by-products offer an extra income.

Date production is a world agricultural industry producing about 5.4 million metric tones of fruit. The date fruit is marketed all over the world as a high-value confectionery and fruit crop

and remains an extremely important subsistence crop in the most of the desert regions. In 2001, the top five date producing countries were Egypt, Iran, Saudi Arabia, Pakistan and Iraq, accounting for about 69 percent of total production (Botes and Zaid, 2002). In Pakistan, area under date palm cultivation shows almost an increasing trend from 1990-91 to 2002-03 (Table 1 and Fig. 1). However, a tremendously increase in area was reported from 1992-93 to 1993-94 when area increased from 101.81 thousand acres to 180.88 thousand acres while for the remaining years, this increase was slight over time. In case of production, it is assumed that with rise in area under cultivation of any crop, its production should increase, other things remaining the same. However, this priori was not observed here in case of Pakistan where production of date palm indicated a somewhat decreasing trend during some years and an increasing trend for other years (Table 1).

Need for the study

Like other fruit trees, date palm trees have also distinguished characteristics like life period of trees, fruiting period, etc. while comparing these trees with annual crops. Therefore, date palm trees have an extended period of output flow, and varying stages of productivity over the lifetime (Chand, 1994). Because of such nature, it is more difficult to determine economics of growing date palm trees as compared to annual crops. A lot of factors affect productivity and life cycle of date palm trees. These include yields, prices and cost of production. These factors are influenced by other variables like soil, climate, market conditions, etc.

It is necessary to have sufficient awareness and know how regarding use of various inputs at different types, profitability of enterprise for making rational decisions at the farm level during various production stages. Studies related to cost of production, and profitability of major crops such as wheat, cotton, rice, vegetables, etc. have been worked by organizations, and individuals (Ahmad et al., 1992, 1994 and 2003). While regarding fruit trees, such studies on large scale are not common. The same is the case with date palm. Unfortunately, little research work has been conducted on finding out economics of growing date palm in Pakistan. Efforts have been made by various individuals to determine economics of orchards except date palm (Ahmad et al., 1993; Shakoor, 2001; Hanif, 2003). Ahmad et al. (1992) determined various financial techniques to find out profitability of mango, citrus, and guava cultivation after having discussions with experts. Shakoor (2001) conducted study on Kinnow growing whereas no such study has been carried out relating to date palm production according to our knowledge. Studies conducted abroad in the recent years indicated that a date production industry has a potential and viability for investing in this sector. Most of these reports focused on economics and marketing of the date palm at national or regional level.

Unfortunately, the farmers and other concerned individuals in Pakistan know very little about economics of growing date palm. The farmers need information regarding investment and returns from fruit gardening business. Keeping in view the importance of date palm in terms of area, production and foreign earnings from exporting date palm, the present study investigates in determining cost of production and profitability of growing date palm orchard.

METHODOLOGY

Analytical Framework

Careful planning is needed to allocate scarce resources amongst the different farming activities, in a way that the best alternative satisfies the respective requirements. Detailed calculations are necessary to determine the capital needed to implement plan and to forecast its financial result.

It should be kept in mind that date production is a long term project and generates only income from year four or five from establishment. Measures should be taken to maintain a cash flow during that period. The important question is the viability and survival of the project. This question can be answered by making financial analysis of the investment. Since, date palm trees generates returns over a long period of time, and early few years involve only cost while the

returns are nil. Keeping in mind such conditions, the present study has been designed to determine returns from date palm for early 15 years. On the other hand, the first few years involve higher costs and low returns while cost decreases and returns increase in the later years. To handle such difficulty, following analytical techniques were adopted to determine profitability of date palm cultivation.

Generally date trees do not start bearing fruit till the fourth year of their life and therefore, annual fruit harvest is divided into two distinct yield cycles: first, from the fifth to the end of the tenth year; and the second from eleventh year to fifteenth year. The main difference between the two cycles is the average number of dates per tree that can be harvested annually. The yield in the second cycle is more than twice as compared to the first one. It was also assumed that selling price of date produce and input prices remain constant throughout the duration of the enterprise. This is a fairly common approach to avoid the complications arising from attempts to include inflation in input and output prices. As regards the costs, they were organized under three separate sections: the first establishment year, years 2 to 4, years 5 to 10 and years 11 to 15. Cost of various inputs used in growing date palm was calculated on the basis of methodology adopted by Ahmad et al. (1993 and 2004).

Returns from growing fruit trees vary with the age of trees. The first few years only involve costs and low returns. Therefore, costs and returns are estimated by discounting future benefits and future costs and these are called respectively discounted benefits and discounted costs. Financial analysis was used to determine profitability of date trees. For this purpose, two techniques i.e. Net Present Worth (NPW) and Cost Benefit Ratio (CBR) were used as discussed by Gupta and George (1974), Vaidya et al. (1991) and Ahmad et al. (1993).

Net Present Worth (NPW) of an investment is the discounted value of all cash inflows and cash outflows of the project during its life time. It can be computed as

$$Net\ Present\ Worth = \sum_{t=1}^{n} \frac{B_t - C_t}{(1+i)^t}$$

Where notations are explained below

B_t = benefits in each year

C_t = costs in each year

t= number of years

i = interest rate

The cost benefit ratio (CBR) of an investment is the ratio of the discounted value of all cash inflows to the discounted value of all cash outflows during the life of the project. It can be estimates as follows

$$CostBenefitRatio = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+i)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+i)^t}}$$

Where,

B_t = benefits in each year

C_t = costs in each year

t = number of years

i = interest rate

The discount rate or interest rate should be equal to the opportunity cost of capital, that is, the rate of interest which could be obtained in the best alternative investment or the rate of interest on borrowed capital. It was assumed as 10 percent for the analysis of the present study.

Source of Data

The subject matter needs to be investigated at large scale while considering farm size, commercial and traditional farms. However, due to some financial and time constraints, this study was limited to Multan district. A well prepared questionnaire was designed to collect information regarding use of various inputs, output, prices of input and output and establishment cost. Purposive sampling method was employed to gather such information from various villages. Our sample comprises 20 date palm growers selected from various villages of district Multan.

RESULTS AND DISCUSSIONS

After being convinced about the marketing potential of dates, and before purchasing land or developing his/her own farm, a potential date grower must seriously look at several factors and cost of various items at different stages is the most important factor while deciding to invest in this enterprise. Careful planning is thus needed to allocate scarce resources amongst the different farming activities, in a way that the best alternative satisfies the respective requirements. Therefore, detailed calculations are necessary for the farmer to determine the capital needed to implement hi/her plan and to forecast its financial result. It should be kept in mind that costs vary from one farm to other farm depending on existing infrastructure, machinery, source of irrigation, etc.

In light of such conditions, an effort has been made to calculate costs of various farm activities in date palm production. However, acquisition of land, source of water supply, mechanization and marketing costs were not included in this study. The breakdown of cost items in this study should be used as a guideline and need to be adapted for each specific situation. Table 2 gives an outline of the establishment costs involved per acre and maintenance cost from year 2 to 15.

Total establishment cost was worked out as Rs. 37146 per acre. This cost included planting material and planting cost, fertilizer and manure, plant protection measures, irrigation, labour and other miscellaneous costs. Labour cost included all expenses incurred on pollination, applying different inputs and harvesting. Planting material and transplanting cost was Rs. 22500 per acre and average number of plants per acre was 90, during the establishment year, planting material and transplanting cost was the major item of total cost. Next important input regarding share in total cost was irrigation. Although, date trees could tolerate harsh climatic conditions, however, during establishment year, the special care is needed in regarding irrigation practice to achieve higher survival rate of transplanted trees. Therefore, cost on irrigation was higher during earlier year and it decreased in the subsequent years. In case of labour, it was estimated as Rs. 5321 and during the establishment year, it included cost incurred on applying fertilizer, irrigation, and plant protection measures and care of plants. During years 2 to 4, total cost was estimated as Rs. 14926 per acre. The major constituents in this period were irrigation, labour, miscellaneous and fertilizer in a descending order.

Operational expenses or maintenance costs represent those expenditures that occur only if production is undertaken. Capitalization of the investment cost is dependent upon the production process. Each activity to improve yield and quality costs money and the manager should decide how much, of which activity and at what cost to apply. A careful worked out balance of inputs in relation to output is needed since maximum production does not necessarily mean maximum profit. Table 2 represents the activities involved in date production with their respective cost during years 5 to 10 and years 11 to 15. It is clear that the expensive activities were labour and irrigation in years 5 to 10 and years 11 to 15. These items indicate that for achieving higher returns, the use of these inputs should be made in optimal way for increasing production of date trees.

Output and Returns of Date Palm Cultivation

Date trees do not start bearing in the early years, therefore, output and returns were assumed zero from first to four year. Output and returns were considered from the start of 5th year

and onward because during that period, output was produced in such amount that could be marketed. Output depends on number of trees planted per acre and in the case of present study; average number of trees per acre were estimated to be 90. From these 90 date trees, output produced was 5220 kg per acre during years 5 to 10 and undiscounted amount was Rs. 156600 per acre. During second cycle that started from year 11 and ends on year 15, output increased substantially and it was 8010 kg per acre and total amount was Rs. 200250 per acre (Table 3). This amount shows that date cultivation gives huge returns by investing less amount of capital. Output does not stop here after 15 years but date trees continue fruiting for a longer period of time.

Financial Viability of Date Palm Cultivation

Realizing the magnitude of the total costs involved, the immediate question is whether the project will survive and it will return in sufficient amount to cover investment made in this project and also it is important that these returns not only cover investment expenditures but also results in profit to the growers. The answers are given in this section and this section will decide the viability of the investment made in date palm trees. It should also be kept in mind that date production is a long term project and generates only income from year four or five from establishment. Measures should thus be taken to maintain a cash flow during that period. On the other hand, simply costs and returns do not serve as true yardsticks for making a decision to go for investing in date palm production. This is due to the fact that costs incurred in and returns from date trees are not comparable without discounting such costs and returns.

The function of cash flow is to provide information on the timing and magnitude of cash. The cash flow statement was made by using 10 percent interest rate or discounting rate to calculate the present worth of costs (PWC) and benefits (PWB). Present worth of benefits (PWB) for the period of one to four years was assumed zero because during this period, date trees generally do not bear fruits (if fruiting occurs in some years then it is in negligible amount). PWC for years 1 to 4 was Rs. 45008 and for the subsequent periods was Rs. 24823 and 12196 respectively. Similarly, PWB for the respective periods was Rs. 74788 and 57766; whereas net present worth (NPW) was estimated to be Rs. 50527 per acre over the fifteen years of date trees and CBR was 1.48 (Table 4) showing that investment in date palm cultivation could be considered substantial and economically justifiable. This CBR implies that investing one rupee in date trees returns Rs. 0.48 which is economically justifiable.

CONCLUSIONS

Depending upon nature and input demanded, the cultivation of date trees is the most suited to areas where harsh climatic conditions prevail in Pakistan. The plantation of the date trees would reduce food deficiency in such areas on one hand and fetches higher returns to people living in these areas on the other hand, thus, improving living standard and likelihood of such dwellers. Keeping in view such importance, the present study was conducted in Multan district to determine profitability of the date trees. Financial analysis was carried out for this purpose. Results indicated that discounted gross income per acre came to be Rs. 74788 during 5 to 10 years and Rs. 57766 during 11 to 15 years whereas discounted cost for the respective cycles was Rs. 24823 and 12196. These results point out that returns from date trees are substantial and Pakistani farmers could earn huge profit if date trees are planned on commercial basis. In this way, the date growers could earn a large amount of profit on one hand and can contribute towards earning of foreign exchange reserves for Pakistan on the other hand.

Net present worth per acre for 15 years is highly profitable from economic point of view and it is Rs. 50527 which indicates that the date cultivation gives higher returns. Cost benefit ratio (1.48) is greater than unity and it is profitable to invest more in the date cultivation.

SUGGESTIONS

On the basis of the findings of the study, the following suggestions are made to abridge the yield potential of date.

- The initial investment in the date cultivation is much higher. This higher investment requires financial resource on the hand of the growers especially for the poor farmers. These people should be provided financial facilities at the door step. In this way, cultivation and production of the date trees could be boosted up substantially.
- Perishable nature of the fruits needs proper packaging, storing and transporting faculties. Marketing facilities are not developed in the growing areas. Therefore, there is a strong need to establish modern marketing system so that the growers could earn higher income.
- Research in the date trees is another area that needs utmost attention of the concerned persons; especially small growers need more attention of the researchers.
- The present study was conducted on a small sample. It is suggested that detailed studies based on larger sample size should be conducted to see the profitability of various farm enterprises. This will help in making more appropriate decisions by the planners, policy makers, administrators and the farmers for achieving optimal allocation of scarce farm resources to alternative enterprises.

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TABLES

Table1: Area and production of Date Palm in Pakistan

Year	Area (000 acres)	Production (000 tonnes)
1990-91	103.78	287.3
1991-92	104.77	292.9
1992-93	101.81	275.2
1993-94	180.88	578.6
1994-95	181.62	531.5
1995-96	182.61	532.5
1996-97	184.10	534.4
1997-98	185.58	537.5
1998-99	186.57	721.6
1999-00	190.02	579.9
2000-01	194.23	612.5
2001-02	193.98	630.3
2002-03	192.50	625.0

Source: Government of Pakistan, 2003.

Table 2: Estimated cost of Date Palm (Rs/acre)

	Years			
Particulars	**1**	**2-4**	**5-10**	**11-15**
Planting material and transplanting cost	22500	-	-	-
Fertilizer and manure	582	1875	3496	2913
Plant protection measures	242	871	3217	2517
Irrigation	6000	7200	14400	12000
Labour	5321	2580	18793	22295
Miscellaneous	2500	2400	1500	2000
Total	37146	14926	41406	41725

Table 3: Projected Output and Gross Income

Particulars	Unit	Quantity	Output (kg/ac)	Amount (Rs/ac)
Year 5-10 58 kg/tree/year	Tree	90	5220	156600
Year 11 to 15 89 kg/tree/year	Tree	90	8010	200250

Table 4: Financial Analysis of Date Palm

Particulars/years	**1-4**	**5-10**	**11-15**
Capital cost (Rs/ac)	52070	-	-
Maintenance cost (Rs/ac)	-	50070	41725
Total cost (Rs/ac)	52070	50070	41725
Gross income (Rs/ac)	0	156600	200250
Net benefit (Rs/ac)	-52070	106530	158525
PWC at 10 % df	45008	24823	12196
PWB at 10% df	0	74788	57766
NPW at 10 % df	50527		
CBR	1.48		